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ABSTRACT

This manual offers detailed guidelines for parent group trainers who conduct workshops on problem solving, math, and science for parents of young children. In addition, discussion starters, a list of hands-on activities, directions for drawing and using a poster, and learning activities for children are described. Counting books are briefly discussed, and number books and science activities are listed. (RH)

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GETTING INVOLVED WORKSHOP GUIDE
YOUR CHILD AND PROBLEM-SOLVING MATH AND SCIENCE

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TRAINER PREPARATION

1. **Review the Getting Involved Booklet entitled *Your Child and Problem Solving, Your Child and Math,* and *Your Child and Science*.** Pay special attention to "Points to Keep in Mind".
2. Read the "Key Points" in the Workshop Guide.
3. Read the "Statement of Objectives" and "Introduction to Participants".
4. Review the "Workshop Outline".
5. Read "Planning for the Workshop".
6. Select activities and discussions from the Guide to use in your workshop. For example, choose an ice breaker, choose some areas for discussion and appropriate handouts, select a hands-on activity, and some displays. Use the table of contents and summaries to facilitate your selection.
7. Familiarize yourself with your selections. If you are using the filmstrip, then preview it and anticipate related discussions. Prepare to lead the selected activities and discussions in your own way, and in your own words, to suit your particular audience.
8. Sequence your selections, using the "Workshop Outline" as a guide. Review the sequence to determine how to manage the transitions from one activity or discussion to the next. If the sequence does not seem to make a logical progression, try a new order or new selections.
9. Practice and time the Workshop by running through the sequence of activities and discussions. It is a good idea to summarize each activity and discussion as they are done in the workshop. Practice the transitions. Plan for breaks and refreshments.
10. Prepare and collect the materials you will need (eg. handouts, materials for hands-on, and ice-breaker activities, etc.).

PLANNING FOR THE WORKSHOP:

Use this list to help you organize the logistics of planning and giving the workshop.

1. How long will your workshop last?
2. What time of day or night will be best for giving your workshop?
3. Who is your audience? Who is your target group?
4. How many people can you accommodate? How many people do you think will attend?
5. Who will contact the participants? How will they be contacted? for example: parent newsletter, note to parent, personal contact, local newspaper, PTA announcement, fliers, posters, radio. . . : Be sure to include all relevant information. How will you know who will be attending? Who should interested parents call? Will they have to register?
6. What facility will you use? Be certain to arrange for a good facility that will provide enough room for participants. If you are serving refreshments be sure that it is permited in the facility. It is a good idea to check to make sure that the facility will be ready for you the day before the workshop.
7. Who will be responsible for transportation?
   Make sure that the person who is responsible for transportation duties is prepared. (eg. size of vehicle(s) is adequate, gas, map or route, times for pick up and drop off, names of people to transport etc.)
8. What refreshments will be served? Make sure that the person responsible for refreshments has addressed all areas (eg. number of participants, preparations for setting up and serving and clean up, nutritious foods, etc.)
9. Plan to arrive at the workshop site early enough to prepare your environment.
   a. set up the displays
   b. plan seating arrangement
   c. arrange materials for presentation
   d. assure that AV equipment is set up and ready to go
   e. have a sign-in sheet
   f. have name tags prepared
   g. have an agenda prepared
   h. have handouts in order
   i. have evaluation forms ready

SUGGESTED WORKSHOP OUTLINE—

This workshop is designed to take approximately 2 hours and 10 minutes for completion. However, the trainer may wish to cut down on parts of it, and cut other segments out altogether in order to better suit his parent group and/or time frame.

The following outline suggests an order of procedure (an agenda) for your workshop.

1. **Introduction - Statement of Objectives - Establishment of Definitions -- 10 minutes.**
   Welcome the group and introduce yourself. Begin your workshop by reading or stating in your own words the Introduction. Review the Objectives by explaining to the participants what you hope they will learn from your workshop. Clarify any definitions if necessary. Pass out an agenda so that the participants know what to expect next.

2. **Ice Breakers - 15 minutes**
   Move on to your ice breaker by introducing it's purpose. By breaking the group into smaller groups you will facilitate interaction among participants. Be sure to summarize this activity after it is over in order to clearly tie in the experience with the objectives of your workshop. Participants should now have some recognition of their own attitudes toward the subject, as well as insight into how their children experience and learn.

3. **Lectures - Discussions - Activities - 20 minutes**
   For the body of the workshop, vary your delivery system using the techniques of lecturing briefly, drawing on participants' experiences by encouraging and soliciting discussions, and providing hands-on activities.

   Define the subject clearly, then ask for examples from participants. Tell how children develop skills in this area, then ask for illustrations from the participants' daily lives. Emphasize why skill development in this subject area is important. Having established a definition of the subject area, having explained how children learn skills in the subject area, having underlined the importance of acquiring such skills, you have paved the way for spending most of your efforts on helping parents see how important they are in teaching their children the subject - in discussing ways parents can help children learn these skills.

   Use your selection of lectures, discussions, activities, displays and handouts from this guide.

   Summarize the points you have made so far.

4. **Break for Refreshments - 15 minutes**
   You have spent considerable time getting the participants comfortable and getting them "into" the topic, so don't let the break and refreshment period become awkward. If the group does not feel comfortable enough to talk freely while eating, then you could structure this time also. Use the environmental displays to draw out conversation, or elicit conversation about the participants' children. Use the time to answer questions about your lectures or about the behavior of participants' children.

5. **Lectures - Discussions - Activities - 20 minutes**
   Continue on from #3. Summarize all key points.

6. **Filmstrip and Discussion of Filmstrip - 15 minutes**
   The filmstrip and Discussion of Filmstrip - 15 minutes
   The filmstrip summarizes what the workshop should have established: defini-

tion of subject (what is math or what is play. . .), how children develop skills in the subject, why it is important, and how parents can help children learn.

Reiterate the key points, alert participants to particular segments of the filmstrip which emphasize these points. The important message is that parents play a key role in their children developing skills.

7. **Review and Discuss Handouts - 10 minutes**
   Use the handouts to reinforce the parental role of helping children learn. Encourage parents to refer and use the handout information at home. Answer any questions.

8. **Review Getting Involved booklets - Give Closing Statements - 15 minutes**
   Pass out the *Getting Involved* booklets indicating that they are a valuable resource for participants as they contain the key points made in the workshop and will remind them of their important roles in their children's development. Use the sample closing statement to bring closure to your workshop.

9. **Evaluation Forms - 10 minutes**
   Pass out and request completion of the workshop evaluation forms. Thank each participant for attending.

Your Child and Problem Solving, Math and Science

KEY POINTS:

When we talk about problem solving, science and math, we must be aware that many related concepts are abstract (such as numerals, and the concept of cause and effect). In order to easily understand problem solving math and science we must present it in concrete form.

Be aware that problem solving, may be threatening topics. Pay special attention to the section in the guide on "The Fear of Math and Science".

Key points for the workshop leader to emphasize during the workshop are enumerated below:

1. Problem Solving, Math and Science skills develop gradually.
2. The development of these skills happens when children use and manipulate many concrete objects. Eventually these experiences lead to connecting the concrete objects to the abstract concepts.
3. Problem solving is a skill basic to learning, which is essentially a thinking process involving: defining a problem, reviewing possible solutions, getting information, and choosing and trying out solutions. Math is the use of and relationships between number, measurement, space and time. Science is the exploration of information about the world and about ourselves.
4. These skills in the early years are important because they help children make sense of their world and become confident about their own ideas.
5. Parents play an important role in helping their children develop these skills and concepts by relating problem solving math and science to everyday activities and talking to their children about them.

STATEMENT OF OBJECTIVES:

Your workshop should help to:

1. Introduce parents to the variety of problem solving, math, and science experiences they have in their every day life.
2. Demonstrate to parents how they can relate these experiences to their children in the family atmosphere so that they can help their children learn related concepts and skills.
3. Emphasize the important role that parents have in their child's education and how they can help without changing their present life style.
4. Show how school activities can be done in the home by the parent and child.
5. Encourage parent-teacher cooperation/understanding so that there can be consistency between school and home for the child.

SAMPLE INTRODUCTION TO PARTICIPANTS #1

Helping children learn problem solving skills:

As parents you can easily help your child learn and enjoy problem solving skills. It's so much better when children learn by doing everyday things, talking about the things that are happening at home, with the family and neighbors. Use everyday words for the things that are happening and suddenly you may realize how much fun you and your child have had, and how much you deal with problem solving every single day.

Talking with your child is the best starting point. You will be introducing problem solving skills, but in a very natural way, and learning will happen without pressure.

What is Math: (Use same outline for science)

Math has to do with the relationships among objects, events and people. Using words such as "how many" or "how much" is using math.

Children explore math all the time when they have experiences relating to number, measurement, space and time.

How children learn Math:

Children learn these math concepts gradually and learning happens naturally; but they must explore and experiment with many concrete or real objects (blocks, beads, pegs, etc.) before they really can understand math in an abstract way. This means that "3" has no meaning for a child until he really understands that the numeral "3" is only the written symbol for three things (it could be !, #, $, but we chose "3")

a. The Trainer should then further demonstrate to the participants what he is really saying.
   1. Hold up three objects all the same (blocks or pegs)
   2. Repeat what you stated before by writing the numeral 3 on a board or paper. Then again state that this "3" has no real meaning until a child knows that these three things he holds in his hand are indeed three things, and when he writes it he writes it this way: "3".

We use math concepts everyday and when we do, it helps us live in this world doing our everyday work. The same is true for children.

The fear of Math:

When people hear or use the word "Math" they seem to display a sort of fear or feeling of not being able to do what may be suggested. (This may come from the past experiences that one has had where math meant tests or drills all with only abstract concepts; the person really felt uncomfortable and they didn't know what they were doing or what was really happening).

Math is around us everywhere, and it's natural and it can be fun. It's not hard; we use it all the time and thus we do know math. (Give some examples of math all around us: eg cooking, driving, buildings, time).

Examples of everyday activities which teach problem solving, math, and science skills:

For instance use things that are alike or different. Children must learn to distinguish differences and sameness before doing certain math problems. Questions and statements like – "Can you find a spoon like this one? How can you find one that is different? They are all spoons, some are alike and some are different." Help the child learn math concepts such as sets.

Help children work through problem solving tasks. This may sound hard but we do it every day. For instance, "We are going to have lunch. How many people are going to eat; then how many bowls do we need, spoons, napkins? I am having coffee, Jose and Sarah are having milk and Dad just wants a glass of water, what do we need?"

Learning measurement for children happens when they figure things out, plan and estimate by doing everyday things that give them the answers to "how much". For instance: "how much clay will he need to make a snowman like David's?" or "Do I have enough time to play this game before lunch?" Help the child learn measurement. Other examples are: "What is a cup of water and a cup of flour?" "How many pegs do I need to fill one row on the board?"

Children also need time to find out how much space is needed to do certain activities. They learn that their shoes may fit in your shoe box but that your shoes won't fit in their shoe box. They can easily see that if they have a box of eight crayons, nine crayons won't fit in and if there are only seven crayons there is an empty space.

Household tasks that are done everyday like sorting the laundry or putting away the silverware may be a chore for a parent. If you give this activity to your child you will be giving him/her a meaningful experience. He/she will be sorting, classifying, arranging according to size or number. It doesn't matter if mistakes are made, you can easily correct the mistake without a hassle. One day there won't be any mistakes and the child will have worked through many concepts and will understand them in a very meaningful way so that later when he is introduced to some abstract math or science terms he will know what it is all about. You will have helped him lay a solid foundation for learning the more abstract concepts in later years.

SAMPLE INTRODUCTION TO PARTICIPANTS #2

Intro: Learning problem solving, math, and science skills begins with something you can touch and feel, like pennies in your hand or a box full of kittens. Playing games and problem solving while playing the games help children to learn problem solving, math and science skills and help to make the world organized and meaningful.

Learning through play:

A child learns to play a game. A child does not think of game playing as learning, although learning is actually taking place. Learning is a means to a happy end, and in so being, it becomes part of the play itself. A child can learn math by playing games, and he can learn math by solving problems, especially when they are problems that are part of his everyday life. Math is all around him in concrete form. The same is true for science experiences.

Math and science are already a part of every childs' world but he is not aware of it. When we make the child aware of the presence of math and science in the world, it suddenly makes sense to him. It can only begin with the concrete, meaningful things, the sticks and blocks he has already handled, already explored, the things with which he feels comfortable.

Parents Teach Problem Solving, Math and Science all the Time.

You as a parent use concrete things every day with your child which teach these skills. You as a parent give your child awareness and thus understanding of problem solving without changing your already established life style. You are giving your child skills he can live with, enjoy and understand. When you are in your home lessons are happening everywhere. Morning arrives and it is the beginning of a new day. Many things will happen during the routine of the day. (Elicit from the group some routine things that relate to problem solving, math, and science, eg. making breakfast, driving to school or getting to work on time, etc.)

ICE - BREAKER

Name of Activity – Choose an object: A getting-acquainted Activity.

Goals:

1. To increase perception of oneself in relation to math (or problem solving or science)
2. To provide an opportunity to share personal perceptions of math
3. To provide an opportunity to receive feedback regarding objects and their relationships to math.

Group Size: unlimited

Time Required:
Suggested 15 to 20 min. – (This can be lengthened to any time up to two hours, but for this particular workshop the shorter time frame seems most desirable.)

Materials:

1. A collection of objects – (all relating to math) – at least twice as many objects as participants.
   a. Be sure to vary size, weight, composition, roughness, smoothness, color
1. A container large enough to accommodate all the objects so that the participants may not see the objects – (maybe and empty potato chip can or similar type container)

Physical Setting:
a room large enough so the group can be seated in a circle.

Process:

1. The trainer briefly discusses the goals of the Activity.
2. He place the container full of objects in the center of the circle and gives the following directions:
   a. At the indicated time, the participants are simultaneously to move into the center of the circle
   b. Each participant is to take one subject or bag from the container
   c. As soon as the participants select an object they return to the original positions
3. As soon as the participants have returned to their places the trainer explains to the participants that they are to examine the object and to think of some ways they think it might relate to math.
4. The trainer may suggest that the participants share information on their thoughts with another person or persons in the participating group.
   a. For example the trainer may divide the participants into groups of 3 or 4 persons and suggest that they examine each others' objects and give each other some ideas.
5. The participants report on the conclusions they have made.

The following is a list of example of objects to be placed in the container for the ice breaker. All items should be packaged in sandwich baggies or freezer baggies.

Some appropriate responses are suggested in the "relationships" column. Emphasize that all of these items can often be found in the home.

Objects	Relationships
10 popsicle sticks	counting; matching; adding on numerals and dots to count; making various lines, (short, long, zig zag, etc.)
10 straws cut in graduated lengths (1/2 cm variance)	sequencing from large to small or small to larger; counting; combining to make one like this one.
a cork and a rock	comparing; weighing, seeing texture; predicting ("What will happen if we throw, drop in water?"); beginning to experiment and problem solve.
a ball and a flat circle	bouncing ball and counting the bounces; comparing (both are round); finding differences (the ball is a solid, the circle is flat); you may want to explain that in geometric terms the ball is a sphere and the circle is an example of a plane.
a sphere and a cube	naming geometric shapes; (Note that the ball and block concept will probably be expressed first. Then you explain that the words sphere and cube are the beginning introduction to the understanding of geometric terms.)
a ruler	measuring; drawing different lengths; making various lines; straight edged shapes; counting the numerals.
10 poker chips 5 blue/5 white	comparing: forming same or different sets; matching one white to one blue.
a circle, square, triangle and rectangle	naming different shapes; questioning what you can do with them; problem solving what is around you that looks like that shape.
two long pices of yarn the same length and two short pieces (when put together are as long as the others)	measuring; finding the ones that are the same and those that are different; placing objects at different lengths; discovering that the two short pieces when put together match the length of the long pieces (addition concepts)
a compass with a pencil attached, two pieces of 4" × 4" paper anda piece of 8" × 8"	drawing designs; measuring angle; matching circle sizes; making big and little circles; discovering that the 2 pieces of 4" × 4" paper equals the same space as the one piece of 8" × 8".
felt numerals 1 to 10	counting; placing in sequence (proper order); feeling the shape of numerals; naming the numerals.
a set of measuring cups	measuring solids or liquids; estimating how much; how many; how many of this will fill that; using words like empty, full, half as much etc.; stacking or fitting into one another; sequencing from large to smaller or small to large

Objects	Relationships
a set of measuring spoons	same as above
a pattern bead card and matching beads, a shoelace with a knot on one end	following a pattern (seeing a sequence and then being able to continue that sequence); beginning to form sets.
a container of real or play money (or both)	counting; learning amounts and how much they are worth; making money meaningful so we can buy things; sorting, stacking, separating, matching like amounts; problem solving, (how much of this is equal to)
1 pair of the following shapes: mittens, hearts, flags, and trees (same objects - the same colors- ex. red hearts, green trees)	pairing; matching like objects; making sets (mitten to mitten, red to red); making combinations of color sets (1 red - 1 blue or 2 red and only one blue etc.)
2 boxes of crayons	counting; matching; seeing different shapes; experimenting and exploring; finding out that only the correct amount will fit into the space provided.
an assortment of Leggo pieces	counting; sorting to color or size or shape: counting circles; discovering that two of one size match another size; stacking; placing in rows.
table place setting pattern drawn on a placemat and matching utensils	matching one object to one space; seeing various sizes; discovering everything is different but still a set; feeling varied weights; mating sizes; likenesses and differences.
unit blocks 1 red, 2 yellow 3 purple, 4 green 5 blue	counting; stacking; sorting into sets by colors; discovering they are all the same size; placing in order from 1 to 5; discovering that you need 2 ones to make 2, 3 ones to make 3 etc; associating quantity to number.

Tips for the Trainer

Make this a fun activity. Don't imply that you will put anyone on the spot.

1. Do not let the ice breaker get too long or repetative.
2. Help the people who are having difficulty relating their selection to math.
3. Choose a person you know is comfortable in responding to be the first one to show his/her object. This is also a way to come up with a long first list and therefore relieve the person who had difficulty finding a math relationship.
4. The participants can work in groups if it appears many might be afraid of giving responses.
5. If you see you have lost the group, stop getting the individual responses and simply ask if anyone has anything else to share. After responses, simply close by repeating the goal. "Math really is around us all the time."

LECTURES – DISCUSSIONS

OBJECTIVE:

To introduce the concept of how much problem solving, math, and science we do in our daily lives.

MATERIALS:

A laundry basket filled with an assortment of clothing. A measuring cup. A box of dry detergent. A bottle of liquid bleach. A container of clothes pins and snap pins. A piece of washline.

PRESENTATION:

I would like to share with you an activity that you may do everyday in your home. I will demonstrate how much you are involved with problem solving, math, and science when you are doing this everyday home activity. When you talk with your child about what you are doing, you are teaching him many related skills.

Here is your laundry basket. Is it large enough to hold all of todays wash? (estimating) If not how many more times do I need to go upstairs to gather the rest of the wash? (estimating) Maybe one of the kids will carry the rest down for me if I put the rest of the wash into a pillow case. (problem solving)

You just saved *time* and *added* another person. Four hands and feet are better than two when there's work to be done.

Now that all the wash is together we will have to *sort* it into white and colored piles. (making sets, classifying). The wash can be sorted into piles of various colors from light to dark. (making sub sets). There could also be a third set of hand wash (making sets, sorting, and classifying).

The wash is now sorted and you will begin the process of washing. How much wash can be put in the washer? (estimating and problem solving). How much detergent and bleach do I need? (measuring) How long will the wash cycle take? (time) If I hang the wash outside how much line do I need? (space and measurement) How many clothespins will I need? (number) Will the sun help it dry? (science concept) Will the wind help?

When the wash is dry it will have to be put away. (space) Some will be placed on hangers, other pieces will be folded and put away. (sorting, space, time and measurement).

Take a towel and say to the child, "This is a towel and we must fold it to put it away." Begin to fold the towel in half, tell the child, "I have just folded the towel in half - but it's still the same towel, isn't it?" continue to fold the towel, telling and asking your child what you are doing. This activity shows that regardless of how small the towel is folded it is still a towel (math concept of fractions)

When you are folding or dividing the towel into smaller parts the whole is still a towel. This activity then becomes a very advanced mathematical activity and [illegible] explanations to the older child who is having difficulty understanding.

[illegible] another example of concrete problem solving, [illegible] as to colors (making sets). You match the colors. (Matching like objects) You find the matching socks. (Making pairs or like sets) There are different sizes of socks. (Seriation)

This everyday activity can thus be used to explore problem solving, math, and science concepts and therefore teach many basic skills related to these subject areas.

Suggested Discussion Starters

1. On an 8" by 10" oaktag sheet - print in large letters:
   "Mathematics Around Us" Use smaller print for bottom: "Mathematics are all around us — we make them real through home experiences" (or do the same for problem solving and/or science)

This card could be used with any of the following sample displays:

Display One:
1) two pieces of material-one laid flat the other softly crumpled.
2) a pin cushion with varied sized pins and some with different colored tops.
3) a dress pattern
4) a pair of scissors
5) some spools of thread
6) a thimble
7) chalk
8) a cloth tape measure
9) a box of straight pins
10) a ruler
11) a sewing basket

Display Two:
1) a blueprint
2) a piece of graph paper
3) a plain sheet of paper
4) a saw
5) a plane
6) a screwdriver
7) a pencil
8) a hammer
9) an assortment of screws and nails
10) some varied pieces of wood
11) a ruler

Display Three:
1) a laundry basket with assorted clothing
2) a bathroom scale
3) measuring cups
4) measuring spoons
5) a box of cake mix
6) a box of jello
7) a box of crackers
8) a place setting with utensils
9) a picture of a doll house
10) a doll house with doll furniture
11) a recipe book
12) a radio or record player and some records
13) a clock

Display Four:

1) a flower arrangement
2) a full grown plant
3) a seedling or young plant
4) a package of flower seeds

Use of Environmental Display

1. Participants can look at the display before the workshop begins or be directed to look at them during break time.
2. These displays can be used for another discussion group to involve the participants in discussing how problem solving, math, and science are all around us in the home, and how we use them all the time doing practical every day activities.
   a. If the Trainer chooses to do the above display as a small discussion group activity make sure to observe the participants and help them with ideas if you see the need.
3. The Trainer can use the displays to show how problem solving, math, and science are around us in our every day lives by reviewing the items in the display with the group and explaining their relationships to problem solving, math, and/or science.

HANDS-ON ACTIVITIES

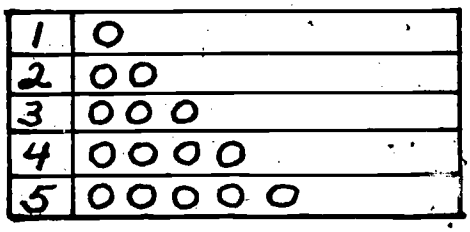
Both of the activities included in this "section of the workshop address one to one matching and numeral recognition. The important fact the trainer must stress when actually playing the activities with the workshop participants is that concrete materials help the child develop skills basic to problem solving, math, and science which lay the foundations for later learning of abstract concepts.

Hands-on Activity Instructions

Name of Activity - Numeral and chip match

Materials Needed
- Oak tag for gameboard - 6½" × 7"
- ruler to mark spaces
- felt tip marker - to write numerals, draw lines and trace chips
- 15 bingo chips
- envelope for bingo chips

The ruler is the guide for marking your spaces (one ruler width for each horizontal line - and on the left hand side, one ruler width vertically for the numerals).



How to Play:

1. Show the child the empty space and how to place a chip in that space.
2. Pick up the chip and say "one".
3. Show the child the numeral (point to it as you say it, or trace it with your finger).
4. Tell the child that this is the way we write "one".
5. Continue playing the game until all 5 numerals have been reviewed.

Name of Activity - The Paper Clip Game

Materials needed to complete:

4 × 4 oaktag squares - (10 for each complete game)
marking pens to write numerals, dots and lines
masking tape to strengthen edges of oaktag
paper clips (55 for each game)
envelopes for paper clips (1 for each game)
folders for game, clips, activity guide & evaluation form (1 for each game)

Make the cards this way:

How to play the game:

1. Pick up one card and tell the child that this is one dot and this is the numeral "one".
2. The numeral "1" means one thing - let's put one paper clip on the card. (Place paper clip on the upper portion of the card which is reinforced with the tape).
3. Continue the same activity with the rest of the cards, ie. this is the numeral 2 - and here are two dots - "one - two" - can you put 2 paper clips on this card.

Some other ideas you can consider:

1. Your child may be able to do this alone.
2. You can help him check the cards by reviewing the number dots and number of paper clips to see if they are the same.
3. Always review the numeral so that the numerals become meaningful. ("This is the numeral one, here is one clip".)
4. The older child who knows numerals may be able to put two cards together and add up the paper clips and begin to form some addition facts by adding the amounts.

ENVIRONMENTAL DISPLAYS

Draw a poster that has four simple scenes on it. The scenes all relate to many problem solving, math, and science concepts found in the home: 1) A little girl playing with pots and pans, 2) a boy pulling a car up the steps, 3) children playing "dress up", 4) a child playing with blocks.

The little girl with the pots and pans is shown to remind us of all the lessons we have in the kitchen. Not only the containers that we use to cook, or the measuring that has to take place when you prepare a recipe, but the many, many experiences:

A cup and saucer Setting the table	one to one correspondence
Sets of bowls Pans and flatware Bowls, pots and pans that fit together utensils	ordering objects - counting seriation
fruits vegetables	classification
place settings utensils foods hot/cold	forming sets
how long will it take to prepare, cook, eat, clean up.	time estimating
preparing a recipe how much will I need	measurements
how many will eat how many knives, forks do I need	number
how much food or beverage will I need for everyone	estimating
Joe is coming for lunch, what else can I add so that there will be enough for everyone?	problem solving

and all the science concepts related to cooking!

The little boy pulling his cars up the steps is pictured to remind us of all the lessons we experience when we walk up and down the stairs in our homes. We count, we go up and down. The steps have certain measurements involving height, width, length, depth. It takes different people various amounts of time when they use the steps. Place one foot on a step, when another and go on counting. If you have no stairs, just think of all the lessons which can be built into walking; the march ("one-two, one-two") helps teach counting and rhythm. You can ask your

child to count the number of steps it takes him to cross the kitchen, and then compare it to your larger steps. Gravity pulls things down the steps, and wheel toys go down a slope. . .

Many dramatic play materials teach problem solving, math & science. As children play at being firefighters, police officers, doctors and shopkeepers, they are classifying characteristics of these roles as well as the specific job tasks. Fire hats, boots and badges relate to "set" building as much as they relate to the job of a firefighter. Numbers can also be involved here: fire fighters and police officers have badges with numbers; police officers give numbered parking tickets and people dial telephone numbers in emergencies. Doctors role playing is also rich: weighing and measuring patients, writing out prescriptions with specific quantities of pills to take, taking blood pressure and so on. Store keepers handle money, which teaches many problem solving and math skills. . .

The boy who is building with blocks reminds us of all the learning possibilities that children explore when playing with blocks. They come to know rectangles, squares, and triangles, and when building they begin to explore shape, weight, size and coupling. If you place a drawing of a block shape on the wall or block shelf, a child will be able to easily match the block in his or her hand to the one in the drawing. This is matching and relationship to like objects and relating 2 dimensional figures to 3 dimensional figures. When block building, children naturally work out problems in architectural construction. How do you build steps? How do you build a ramp? How do you make doors and windows? Then, when children put their blocks back on the shelf you can ask them to find a block as long as this one or smaller than that one, or ask a child to build piles of no more than five blocks, or to pick up less than four, or more than six, or to collect all blocks half this size and estimate the number left, or to tell whether there are more blocks left on the floor or on the shelf.

FILMSTRIP DISCUSSION

SUMMARY:

The filmstrip designed for this workshop focuses on problem-solving, math, and science. In clear and simple language it explores the definitions of problem-solving, math, and science as they relate to young children. The filmstrip then gives brief information on how children develop skills in these areas and why such skills are important. The rest of the filmstrip, about two-thirds of it, explains ways that parents can foster the development of such skills in their children. Practical ideas are given to emphasize the important role that parents play in helping their children learn problem solving, math, and science skills.

POINTS FOR DISCUSSION:

1. Reiterate the sequence of the film for the participants:
   - What is problem solving to a child? Math? Science?
   - Do you believe that learning in these areas begins in infancy?
   - How do these skills relate to later life?
   - Can parents foster this skill development at home?

2. Brainstorm with the group to explore more ways in which parents can foster development in these years. "Does the filmstrip give you some ideas about how you help your child learn math (science, problem solving)? Can we think of some more ideas? Think of the things you've been doing everyday. . ."

3. Pass out some activity handouts to give the participants some highly structured hand-made activities to do with their children at home. You might choose to follow the film with another hands-on activity (Make-n-Take).

SAMPLE CLOSING

Discussion on GETTING INVOLVED BOOKLETS and distribution of booklets to participants:

This discussion should be a review of your whole workshop. Using the booklets as your guide, go over some of the key areas. You can hold the booklets up and show some of the pictures as you are speaking about the concepts it is presenting to parents.

Example of discussion:

Parents do play a very important role in helping their children develop problem solving, math and science concepts. The development of these skills can occur naturally and gradually in the home. The family can play a key role in the child's acquisition of those skills. Everyday in the home many related concepts surround you and your child. The everyday things you do actually teach and reinforce meaningful problem solving, math and science skills as your child grows. Talking to your child is very important, especially when the words reinforce the concrete or real things you do in the home. The words help the child become aware of concepts such as: "how much", "how many", "how tall", "how soon". Sorting wash, counting stairs, making jello, setting the table, going shopping are normal everyday activities which will help your child understand problem solving, math and science.

Go home today and plant a few seeds. Your lessons will have already started. You will have decided how many seeds, how deep, how much water and soil; you may have sorted seeds into sets, chosen the right size pot. The experiences will go on and on as the seeds grow. A seed grows bigger and bigger each day into a plant. A plant develops a bud, then a flower, with so many petals (in a geometric design) and soon it will develop seeds. The cycle begins again in time. The growth of your plant brings problem solving, math, and science experiences to you and your child in many concrete ways.

WORKSHOP EVALUATION FORM

_____ Workshop

Trainer: _____ Date_____

Name _____

1. The workshop information was: (check [redacted] y boxes as you wish)

____ new	____ repetitive
____ enjoyable	____ not enjoyable
____ clear	____ confusing
____ useful	____ useless
____ too short	____ too long
____ just what I need	

2. The most enjoyable part of the workshop was:

3. The least enjoyable part of the workshop was:

4. If you were to add something to this workshop, what would it be?

5. If you were to leave out a part of this workshop, what would it be?

6. Would you like another workshop in this area? ____ yes ____ no

7. Overall this workshop was:
____ poor ____ fair ____ good ____ very good ____ excellent

ACTIVITY TO TEACH PROBLEM-SOLVING, MATH AND SCIENCE SKILLS

Objective:
Child will learn to identify shapes, and to sort and classify them into like sets.

Materials needed:
1. 1 piece of oaktag, 12" × 18"
2. 5 pieces of colored construction paper, 9" × 12" (yellow, orange, blue, red, and green)
3. pencil
4. scissors
5. ruler
6. glue
7. compass

How to Make:

1. Make a shape pattern for a 1½" diameter circle from one color construction paper; make a shape pattern for a 1½" square from a different color construction paper. Continue until you have all shapes: circle, square, triangle, rectangle, diamond, each a different color. (Size of each about the same; small enough to fit all of them on the oaktag make sure the shapes are accurate.)
2. Trace your patterns to make an identical set of shapes, in the same colors. Glue these to the oaktag; this is your gameboard.
3. Trace your patterns to make another set of the same shapes in different colors. Repeat until you have no more paper.
4. Keep all shapes in a plastic lunch bag for protection.

How to Play:

1. Present the shapes to your child as follows:
   a. Point to the circle and say "This is a circle." (You might outline its shape with your finger.)
   b. Ask your child to point to the circle.
   c. Point to the circle and ask your child "What is this?"
   d. Repeat with other shapes.

   Now take out the shapes which match the gameboard shapes in color.

   a. Pick up the circle and say "This is a circle. It matches this circle."
   b. Place the circle shape on the gameboard circle.
   c. Repeat with all shapes making sure that your are holding your child's attention.
   d. Remove shapes. Pick up the circle and say "This is a circle. Can you put it on the circle here?" (hand him the circle and point to the gameboard).
   e. When he does, say: "What is the name of that shape?" Repeat with all shapes.
2. Eventually you can hand your child the baggie full of shapes. Place the gameboard in front of him. Ask him to find all the circles and match them to (place them on) the gameboard circle. Repeat with all shapes. Always remember to reinforce the names of the shapes.

HANDOUT

Activity to teach problem solving, math and science skills

Objective:
The child will be able to sort shapes and arrange the shapes in order from smallest to largest.

Materials Needed:

16 sheets of colored construction paper 12″ × 18″ one of each color, red, blue, yellow, green.
pencil, ruler, scissors
for the circle shape - a pin tin, cereal bowl, peanut butter lid, baby food jar lid

How to Make:

1. Take the materials for the circle shapes and place on one sheet of paper. Trace and cut out.
2. On the second sheet of paper draw the rectangle shapes 12″ × 5″, 2½″ × 6½″, 1½″ × 3″ and 2½″ × 1″. Cut out.
3. On the third sheet of paper draw the triangles, 8″, 5″, 3″, 2″ (height). Cut out.
4. On the fourth sheet of paper draw the square, 7″, 4″, 3″, 2″ (per side). Cut out.

How to Play:

A. 1. Place the pile of shapes in front of your child.
   2. Ask your child to sort the shapes into piles so that all the circles, triangles, rectangles and squares are all in separate piles.
   3. Review the names of the shapes.

B. 1. Start with one shape and have your child arrange the shapes from largest to smallest. (eg. "Find the biggest circle", then "Find the smallest circle", then "Find the next biggest" etc. Use words like shorter, taller, large, small, smallest, biggest, middle, medium size, bigger, smaller, larger than. . . etc.)
   2. Do the same with all the shapes.

Variations:

1. Help your child to sort shapes and learn the names of the shapes (there is a variety of ways to sort these pieces).
2. To make seriation clearer, remove the two middle sizes so that it is very clear which piece is large and which one is small.
3. Practice counting to four.
4. Review ordinal position: first, second, third and fourth.
5. Using 3 sizes introduce the concepts of first, middle and last.
6. Cut the circle shapes out of different colored paper. Do the same with the other shapes. Now the game is harder because it is no longer color coded.

COUNTING BOOKS

Counting books range from those that present numbers, usually numerals from one to ten, in the simplest way, to books that tell a story or are used by an artist to present shapes or situations.

Young children often confuse mass and numbers, or size and position so concept books are very important.

When looking at picture counting books, be careful that the ideas presented to children are clear. For example, in *The Sesame Street Book of Numbers,* four objects follow the numeral 4, five follows 5, and so on - but the picture for 8 shows not eight objects, but an octopus with eight tentacles, and this can be confusing.

Brian Wildsmith's 1, 2, 3's is a beautifully illustrated book, however, when an arrow points to a geometric figure and the text asks "How many?" it isn't clear whether the question means green shapes or triangles.

It is therefore very important that counting books are clear. That there is a relationship to the pictures, text and the numeral. That the objects are easily defined if they are intended to be counted. The best books are those that have plenty of open space to set off numerals and objects, and books where the numerals are large and clear.

NUMBER BOOKS

Author	Title
Baum, Arlene & Joseph Colorful, concept book.	One Bright Monday Morning
Budney, Blossom Counting book, comical.	A Cat Can't Count
De Caprio, Annie Counting book.	One, Two
Eidhenberg, Fritz Counting rhymes.	Dancing on the Moon
Fisher, Leonard Everett Math concepts, simple.	One & One
Francoise A different counting book.	Jeanne Marie Counts Her Sheep
Friskey, Margaret Everybody's favorite	Chicken Little Count to 10
Friskey, Margaret Better than a counting book, colorful.	Mystery of the Farmer's Three Fives
Haley, Gail C., Ill. A book of counting rhymes.	1, 2, Buckle My Shoe
Ipcar, Dahlov Children enjoy animals they know.	Brown Cow Farm
Ipcar, Dahlov More animals to count.	Then Big Farms
Reed, Mary/Oswald, Edith Just what the title implies.	Numbers What they look like What they do.

SCIENCE ACTIVITIES

The following list suggest activities which all relate to science. Discuss with your parent group what you can teach your child about science by doing a related activity at home.

Different kinds of weather
Air
Using a flashlight
Water properties
Nature collections
Color changes
Growing plants
Seasons of the year
Magnets
Ice
Mechanics (pullies, inclined plane, leaver)
Changes in ingredients in cooking
Insects
Exploring the immediate neighborhood
Visiting or raising a pet
A trip to the doctor
A trip to the dentist

HANDOUT